DISCUSSION GUIDE

Into the Outdoors

PROTECTING FORESTS, ENHANCING LIVES

Natural Resource Science

GRADE LEVELS
6-12

CONTENT AREA
Sustainability

UNIT THEME
Forestry

TOPIC
Forest management best practices.

The following short videos follow the elements of the discussion guide and highlights key points for sustainability.

Young Forest Initiative - https://vimeo.com/324354556

Forestry Careers - https://vimeo.com/324352708

ENDURING KNOWLEDGE

Students should know the purpose for managing forests, and understand why forests need management plans and implementation.

Learning Targets:

1. Students should know that:
   a. cutting down trees is not always a bad thing.
   b. people harvest trees for many good reasons.
   c. ecosystems benefit from sustainable tree harvesting.
   d. modern foresters have a detailed management plan for harvesting and reforesting clear-cut forests.
2. Students should know the job of a forester is an important part of managing raw material and natural resources, as well as animal and public welfare.
3. Students should understand the importance of managing forests for wood, habitat and natural resource protection.
4. Students should understand the basic science and planning behind managed forests.
5. Students should understand the goal of managed forests.
6. Students should understand how they can support healthy forest ecosystems.

TEACHER BACKGROUND

History:

In the 1800's, much of Wisconsin's forest resources were clear-cut. Clear-cutting was done to efficiently harvest the wood resources needed to build homes and towns in Wisconsin's settlement period. The cleared land that resulted was either left to naturally re-forest, or was used for agriculture. Deforestation of Northern Wisconsin is viewed in popular culture as a drastic change on the natural environment. It is viewed negatively because of how many total acres were affected, the resulting change in plant and animal communities, the changes in soil and waterways, and the reduction of future resources. History shows that harvesting natural resources without a plan leads to resource shortage and possible extinction. While this is true, these facts may lead students to believe that all resource use is bad. The key to understanding modern forestry is understanding how the system works.

Modern forestry uses science to take into account the future of the resources and, with careful planning, ensures that resource benefits are maximized in the present and future for both the native plants and animals that live in the forests and the humans that utilize timber resources after harvest.

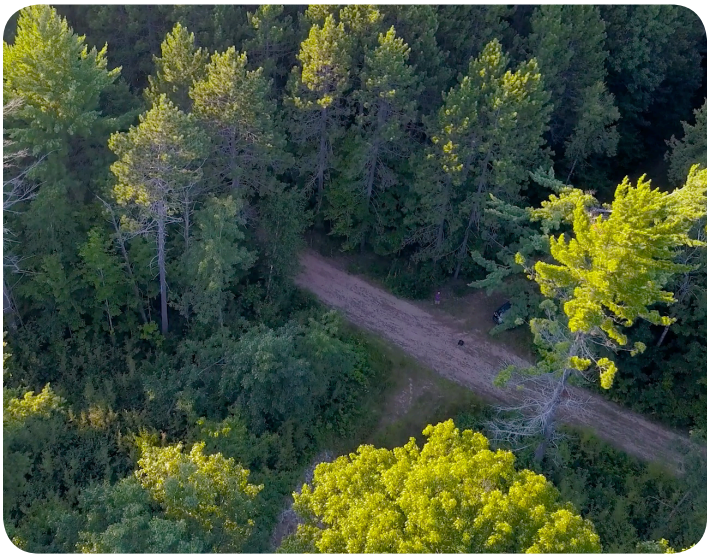
Science and Technology:

In Northern Wisconsin, there are four main types of forests. These forest types each have specific trees, bushes and herbaceous ground cover plants. The forests grow particular areas due to that area's soil type, water availability and maturity of the forest. Different kinds of plants and animals flourish in each forest type. Having all four forest types provides maximum biodiversity of plants, animals and habitats in the region.

Forests all go through a maturation process called "succession." In succession, an open lake can become a cattail marsh or bog, then eventually fill in to make a grassy field. Eventually, pioneer trees that prefer full sun colonize the field. In their shade, forest trees that prefer to grow in lower sunlight conditions begin to grow in the understory. Eventually, the pioneer trees age out and die, and the mature forest trees dominate. The mosses, ferns, fungi and plants that move in with the forest break down the dead wood and turn it into loamy soil that in turn feeds the forest ecosystem.

Eventually, two things will happen in the mature forest. Either the forest continues without disruption, and it stagnates in the climax state, or a disaster will disrupt its stasis. This disaster is usually a forest fire, but could be a flood, volcanic eruption or other regional environmental change. In the wake of the disaster, the canopy is opened up for regeneration to happen. This increases biodiversity in the region if there are both mature climax forests and regenerating forests in proximity.

What forest management does is mimics the good effects of climax disruption without all of the negative effects. In a forest fire, resources are destroyed and animal lives are lost. Water resources could become polluted and soil washes away without ground cover. A major fire is a devastating occurrence. However, forest management generally does the opposite. Resources are used instead of lost. Animal lives are enhanced through the increase of diversity in the landscape. The cover plants remain to hold the soil, and keep the water clean. Additionally, harvesting and managing forests reduces the potential for disastrous forest fires. Dead wood is not allowed to build up to dangerous levels, causing inevitably hot fires because of large fuel loads. In a properly managed forest, fire could potentially run through it without being destructive to the ecosystem. In fact, some managed forest regions use fire to keep forest fauna healthy, improve the soil, prepare seed beds, and provide forage for wildlife - as well as reducing tree litter on the ground that could fuel out of control wildfires.



Learning Focus

Forests are managed with clear objectives that everyone involved can implement to the benefit of the humans and wildlife that depend on them.

Forest management is accomplished in three stages. Step one is to identify the objectives for the forest. The objective could be to regenerate a certain type of wood resource. It could be to improve biodiversity and habitat. It could be for seed production, endangered resource regeneration, or even human recreation activities such as camping and hunting. Usually, foresters take many of these benefits into account when determining the objectives for a forest's management.

The second step in forest management is planning. The planning stage determines who will be involved and what actions and behaviors will be needed to achieve the objectives. For example, one forest in the video highlighted a family that had occupied a certain tract of land for four generations.

Foresters work with these landowners to identify objectives and give them an action plan for what they should do on their property, and what the foresters will do for them to implement the action plan. Other forests may be owned by paper or lumber companies, or state and national parks. Each forest will have a purpose to be fulfilled, so the stakeholders must take certain actions to achieve the end objectives.

The third step is implementation. In this stage, the stakeholders and foresters work together to get tasks done by themselves, or by hiring contractors. Implementation could take over 100 years to accomplish, which is why the plan and its clear objectives are so vital. Many people will have to be involved in implementing the plan - either generations of landowners, several career lifetimes of foresters, or whoever the land is passed on to in the future. A forestry plan provides the continuity required to achieve the objectives laid out decades prior.

One of the most important economic benefits to a managed forest is the product potential of the wood itself. When the trees in the forest need to be harvested, the wood is in demand for many different types of products, depending on the wood type itself. For example, many soft woods are suitable for building materials, where hardwoods are suitable for furnishings. Both types produce usable wood and waste material in the manufacturing process. The waste material of either type of wood is utilized for products such as press wood, mulch, animal bedding and fuel pellets.

In company forests, lumber or paper companies may actually own the land and plant the type of trees they wish to harvest for their products. Planting for harvest is part of agriculture and is a key part of sustainability of resources and the environment. Forestry management provides jobs and economic health for Wisconsin.

Extensions:

There are many links that have short articles on how managed forests reduce the risk of wildfire. Have students look up that topic to find where these practices are used and where they are needed. Encourage them to focus on why forest management prevents wildfires.

Students could also research careers in forestry. In the video, the following careers are highlighted: forester, contracted land managers, lumber harvesters, wood product manufacturers and wood artists. What kind of education, certifications and experiences do these careers require? What kind of technology do they use? What environment is the work done in daily?

Wood products are another topic on which students could focus their research. What type of products are made from a certain type of wood? What properties does the wood have that makes it suitable for that product? How many trees does it take to make something like a chair? What is done with the leftover wood from construction? How could we make wood processing more efficient or sustainable by using resources more wisely?

VOCABULARY:

The vocabulary in this unit is extensive, and occurs throughout the video in very quick bits. A supplement will be provided at the end of this guide to use as a scavenger hunt sheet where students can try to catch and record the meanings of different words. Because the definitions flash so quickly, the students may be provided with additional time to look up or discuss the meanings of terms with discussion groups. Words defined on-screen are italicized.

Clear-cut: the practice of cutting all trees, or all of a certain type of dominant tree, in an area.

Managed Forest: forests that are planned and cultivated for a purpose.

Resources: anything that can be used by an organism.

Habitat: a place with resources that organisms need to live.

Regeneration: the process of growing again from a previous state of maturity.

Habitat typing: *specific habitat with a set of fixed variables.*

Snag: *a dead tree.*

Course Woody Debris: *large bits of wood on the ground.*

Scarification: *raking or breaking up soil for seeds to colonize.*

Sivilculture: *farming trees.*

Sustainability: managing resources for future use.

Exclosure: *a place that keeps deer out in order to protect seedlings.*

Forest Legacy: *a plan that provides management for future generations.*

Stewardship Plan: a plan that shows the specific activities needed to effectively manage a habitat and resources for a specific goal and purpose.

Objectives: key goals in a plan that guide the plan activities.

Forest Certifications (3 types): *Sustainable Forestry Initiative, Forest Stewardship Council and American Tree Farm System are required for harvesters in Wisconsin.*

Pulpwood: *wood used for making paper products.*

Bolt: *wood sawed to length for lumber companies or pallets.*

Cut-to-Length Logging: style of logging using two large machines to cut trees to specific log lengths and moving out for loading on trucks for transport to sawmills.

Pioneer Species: *the first trees to colonize an open field.*

Even-aged: *when all trees grow up together and are a consistent height and girth.*

School Forests: places owned by school districts that allow students to learn about forestry and forest ecosystems during exploration trips.

Softwood: wood such as aspen or pine that grow quickly and have a soft quality to the wood. They are easily worked; often straight and suitable for building structures.

Hardwood: wood such as oak or maple that grow slowly and has a tough, durable quality. They are not damaged by everyday use; suitable for flooring, furnishings, and decorative application where woodgrain is desired.

Woodgrain: *pattern that wood exhibits that gives it a decorative quality.*

Shiplap: *wood used for outdoor and indoor siding and facing applications.*

Ripsaw: *fast saw for cutting logs into a specific dimension of board width and depth.*

Grit: *size of sandpaper grain for smoothing wood.*

Reclaimed Wood: *wood that is reused from a previous application.*

Live Edge: *wood that did not have its outer edge removed; sometimes retains bark.*

Urban Wood: *wood harvested in cities.*

Before Viewing the Video:

Ask the students to discuss what they currently know about how forest resources are used. It may be helpful to complete a KWL chart, the K and W before the video and the L after the video. (What I Know. What I Want to Know. What I Learned). Also ask them to discuss what they know about the importance of the critical question and how it affects their lives.

You can either create one or use the *example below*

K-W-L Chart

Topic: _____

What I Know	What I Want To Know	What I Learned

VIEWING AND DISCUSSION GUIDE:

Before viewing the video, it may be helpful to create a "guide sheet" for students to take notes on while watching the video. From the Teacher Background, select key headings and questions that will help guide students in picking out significant information. Include questions about how the topic could impact their lives and how the topic relates to other areas of science.

Here are some examples:

History:

- How did the forests in Wisconsin originate?
- What happened to these forests in the 1800's?
- Why did people need to cut the trees down at that time?
- What was the result of the deforestation in Northern Wisconsin?
- How do you think the land was used after trees were cut down?

Conservation and Technology:

- For creating a sustainable forest resource for the future, what do you think people had to do between the 1800's and now?
- Do you think a forest would regenerate better and faster if people played a part in it? How could they help the forest regenerate?
- What kinds of resources do trees need? Do all trees need the same amounts of these resources?
- What threats do you think trees have? How could people intervene to minimize these threats?

Life Cycle and Habitat

- What is the life cycle of a tree?
- What is the life cycle of a forest?
- How do the trees in a forest change the climate underneath them to provide habitat for other plants and animals?
- What uses do animals have for the trees in a forest?

Purpose of Managed Forests

- What do people use forest wood for after harvest?
- What other resources or opportunities do forests provide as they grow?

AFTER VIEWING THE VIDEO

Guide a student discussion about the key points and questions in the Discussion Guide. Also explore what the students learned and the significance of the topic to their lives.

If the topic is potentially controversial or has different stakeholders involved, divide the students into "user groups". Have the different groups prepare a presentation of their viewpoints or goals for a classroom debate on the topic. Focus the discussion to address the critical questions in the video or key points in the Teacher Background. For expanded learning, give the student groups additional time to prepare posters or media presentations as part of their presentations.

Evaluation:

1. An informal assessment can be made from students' notes and their participation in the before and after viewing discussions.
2. Activities can be assessed using rubrics based on good research, presentation, and material construction.

Extended Learning:

- Complete the L part of the KWL chart after the discussion.
- Have students research the answers to the questions they had in their KWL chart or Discussion Guide that were not covered in the discussion.
- Students can group together and research a sub-topic related to the main topic. These sub-topics could include the following: history, innovation or technology, careers, and impacts on the environment or society. Students have the option on the method to present their findings to the class.

Word Scavenger Hunt for "Protecting Forests, Enhancing Lives"

There are many specialized words that people use to describe how they manage forest resources and use the wood that forests produce. In the video "Protecting Forests, Enhancing Lives," the storytellers use words in context, explain word meanings and show pop-up definitions on the screen. These definitions go very fast!

Your challenge will be to catch as many word meanings as you can. You may do this individually, or as a group. In groups, you may discuss the information you heard and work together to come up with a meaning for each word or phrase.

Here we go! Listen closely to see how many terms you can catch!

Clear-cut _____

Managed forest _____

Resources _____

Habitat _____

Regeneration _____

Habitat typing _____

Snag _____

Coarse woody debris _____

Scarification _____

Silviculture _____

Sustainability _____

Exclosure _____

Forest _____

Legacy _____

Stewardship plan _____

Objectives _____

Forest Certifications (3 types) _____

Pulpwood _____

Bolt _____

Cut to length _____

Pioneer species _____

Even-aged _____

School forests _____

Softwood _____

Hardwood _____

Woodgrain _____

Shiplap _____

Ripsaw Grit _____

Reclaimed wood Live edge Urban wood _____